

**Research, Engineering and Development Advisory Committee
Federal Aviation Administration, Bessie Coleman Room
800 Independence Avenue, SW, Washington, DC 20591**

Meeting Minutes

On April 29-30, 2003, the Federal Aviation Administration's (FAA) Research, Engineering and Development Advisory Committee (REDAC) met in the Bessie Coleman Room at FAA Headquarters. Attachment's 1 and 2 provide the meeting agenda and list of attendees, respectively.

Welcome and Introductory

REDAC Chair, Dr. Boehm-Davis, and FAA's Director of Aviation Research, Dr. Herman Rediess, welcomed members and visitors. After reading the public meeting announcement, Dr. Rediess introduced the FAA Administrator, Hon. Marion Blakey.

Remarks – Hon. Marion Blakey

Administrator Blakey asked that the members introduce themselves, after which she acknowledged the service of the committee members for their time and energy.

Ms. Blakey stated that the Agency's Strategic Planning Committee is still working on the new FAA strategic plan. The new strategic plan will be essentially a business plan, one that we can measure our resources by. There is a draft of a plan being developed now.

Ms. Blakey shared the following goals:

- 1) Safety – reduce the fatal aircraft accident rate by 80% by 2007. We are also working to expand capacity both on the ground and in the air.
- 2) International Leadership –the United States must retain its word leadership, but we cannot appear over zealous in the world forum as we work with our international counterparts to create a seamless global system.
- 3) Organizational Excellence – limited resources are becoming a challenge. We must use resources smartly and make good use of our working partners. We must leverage the resources of NASA and DoD to make sure that we are on target and working in conjunction on mutual goals.

The Administrator pointed out that in the next 2-5 years, the FAA must accomplish some critical research, creatively – we must use our scarce funds well. She explained that this requires a partnership with our colleagues, and she looks forward to taking part in future meetings. She reiterated that groups such as RTCA and others are important partners. She looks forward to working with the Committee to see that the goals are accomplished.

Welcome New Members – Dr. Herman Riediess

Dr. Riediess made the following introductions and welcomed new members:

Joan Bauerlein, Deputy Director, Office of Aviation Research.

Victoria Cox, Program Director, Aviation Research Division.

New Members: Jerry Thompson, Sarah Dalton, Dave Watrous, Paul Polski, and Ray LaFrey.

Farewell to Retiring Members – Dr. Herman Riediess

Dr. Riediess thanked the retiring members: Mike Benzakein, Jim DeLong, John Hansman, Lou Mancini, John O'Brien, and Deborah Boehm-Davis, for their dedicated service to the REDAC. Dr. Boehm-Davis agreed to extend her tenure as Chair until the FAA named a replacement.

Meeting Process and Objectives – Dr. Herman Riediess

Dr. Riediess stated that at this meeting, the subcommittees would be presenting their reports. On day two of the meeting, the Committee would review the FY 05 budget and discuss their recommendations with FAA senior management.

Flight Plan 2025 and Beyond - Mr. John Kern

Mr. John Kern, FAA, reviewed the findings from the Commission on the Future of the United States Aerospace Commission report.

He stated the FAA needed:

- Goals to establish U.S. pre-eminence in aviation.
- A strong interagency research system and the development of a national transformation plan that changes the way (technology, procedures, etc.) the FAA currently manages air traffic.

Mr. Kern mentioned that FAA's overall air traffic system will need to be flexible in terms of operational concepts, policy, and implementation commitments as we move into the future. The cornerstone for the national transformation plan is the RTCA Concept of Operations (published late last year). Boeing and NASA work is also being considered. The FAA's Operational Evolution Plan (OEP) is also being used as a guide.

With regards to the transformation plan – the FAA is interested in new and different air traffic control concepts. Currently, we are consolidating the ideas proposed by others in the aviation community, and then will develop a government plan with NASA, DoD, industry, and others. The FAA and NASA are setting up a joint program office in Washington, DC to prepare the new operational concept.

Report Approval - Aviation Communications Research Investments - Mr. Paul Drouilhet

Mr. Paul Drouilhet, Chairman of the Aviation Communications and Research Technology (ACRT) Workgroup (Subgroup of the Air Traffic Services Subcommittee), provided the following highlights of the report, which the Committee unanimously approved.

The FAA should concentrate on short and long-term communications issues. Although there are implementation issues in the near term, resolution of those issues does not necessitate a research effort.

The Europeans are channel splitting to 8.33 kHz and using VDL Mode 3 for voice communications. This is different from the U.S. approach and the FAA should work with the Europeans to identify a common solution.

Oceanic Communications – The U.S. is implementing new oceanic controls with highly reliable communications with Controller Pilot Data Link Communications (CPDLC) using Inmarsat. This is an expensive way of doing it, and the subgroup believes that a less expensive and more efficient way of doing this is needed. Another subgroup is working on the oceanic issue. This will be reported at a future REDAC meeting.

The subgroup believes the FAA should work more closely with international aviation authorities to come up with a worldwide international solution for communications issues.

The United States should establish an operating concept for the best way to communicate, focusing on specific communications systems.

The FAA needs to invest heavily in communications systems. Other agencies including DoD have work that is transferable to civil aviation. Security in civil aviation makes it even more important.

Subcommittee Reports and Recommendations

In February and March 2003, the standing subcommittees reviewed FAA's R&D investment areas, including air traffic services, airport technology, aircraft safety, human factors and environment and energy. After reviewing the respective investment portfolio proposed by FAA, each subcommittee generated recommendations and each of the subcommittee chairmen presented recommendations to the Committee. Attachment 3 provides the subcommittee reports.

Subcommittee on Air Traffic Services	Mr. Jerry Thompson
Subcommittee on Environment and Energy	Dr. John-Paul Clarke
Subcommittee on Aircraft Safety	Capt. Chet Ekstrand
Subcommittee on Airports	Mr. Richard Marchi
Subcommittee on Human Factors	Dr. John Hansman

Subcommittee on Air Mobility for Small Communities (AMSC) -Terms of Reference Approval - Mr. Ron Swanda

Mr. Swanda stated that they have changed the name of the subcommittee (formerly SATS) to AMSC.

The REDAC approved the Terms of Reference, creating the ad hoc subcommittee, and asked the following questions:

- Will this fit with NASA's objectives?
- Is there an overlap with the REDAC's ATS subcommittee?.

There are REDAC subcommittees with varying relevance. ATS, for example, is looking at a larger development activity that will require coordination with NASA. Small communities, however, are not a focus of that subcommittee, hence, it is important to create the AMSC.

This is a special ad hoc subcommittee that will include members from the other subcommittees as needed.

This ad hoc subcommittee can make proposals to REDAC, not NASA or FAA employees. The subcommittee only has the power to bring its questions, proposals, and recommendations to the REDAC.

DAY 2 SESSIONS -

Goals Based R&D Budget Status and the REDAC Advice Process – Dr. Herman Rediess

Dr. Rediess provided an R&D Overview and Status of the FY 03-04 budgets.

The FAA's FY 04 request is \$14 billion. The R&D funds are a very small amount portion of the overall request. The R&D request focuses on safety research.

There is a portion of the free flight program that has been transferred to TSA. The Airports Technology R&D program is currently being funded under F&E. In the planning for FY 05 request, the FAA has kept that program in F&E, since Congress has not supported funding those activities out of AIP.

The FY 04 R,E&D request is \$100 million, a 30 percent cut from FY 03, per the Administration's guidelines. Programmatic planning is being done based on this request. The R&D program planning teams establish the program priorities, the R&D Executive Board discusses those priorities, and then the Joint Research Council makes the final decision on what will be funded.

The budget process begins 18 months in advance. In FY 04, the aviation weather research program, for example, is facing a reduction of \$12.8 million. Because of this, the planning teams, based on priorities, determined to delay several projects, such as turbulence research.

REDAC Advisory Process – Dr. Herman Rediess

With regard to the REDAC process, Dr. Rediess pointed out:

- The committee would be served better if they could be given materials before the meeting.
- The Committee should use a figure of 80% or 90% budget as its guideline.
- The REDAC should be provided TCRP recommendations to use in its deliberations.
- The budget review/recommendation process should be standard for all subcommittees.
- The REDAC should understand the FAA's strategic mission and goals when making investment recommendations.

The Committee should help define potential near-term solutions to help the FAA meet its challenges.

- The structure of the REDAC subcommittees is lines of business. When the Committee begins to assess future capabilities, it might consider changing its structure, since the lines of business do not seem to be aligned with Agency goals.

FAA's Informal Response to Recommendations – Dr. Herman Rediess

Dr. Rediess provided an informal response to recommendations received by the Committee's December 3, 2002, letter to the Administrator. The Administrator will send a formal response to the Committee.

REDAC Executive Recommendations to FAA Associate/Assistant Administrators

Dr. Boehm-Davis stated that this portion of the meeting provided REDAC and subcommittee members to discuss concerns and ask questions of FAA's Associate Administrators, allowing the Associates to articulate their goals objectives.

Dr. Boehm-Davis began the session by asking the associates to ponder the following questions:

- 1) How do you see your area vision tied to the Administrator in the aerospace commission report?
- 2) How do you see your research plans within your portfolio?
- 3) Where do you fit in with FAA and goals in the marketplace?
- 4) How do the goals work in what you already do?
- 5) How can we address the issue of access to facilities for R&D since 9/11?

Dr. Boehm-Davis opened the floor for responses from the associate administrators.

Charlie Keegan, Associate Administrator for Research and Acquisitions, opened the discussion, explaining that the FAA hopes to work more closely with the REDAC to increase capacity.

Dr. John Hansman asked, from an investment portfolio standpoint, if there would be some investment to improve capacity.

Mr. Keegan responded that the money that goes to capacity isn't zero, but it has to be applied in a special way. For example, the Safe Flight 21 program does capacity work. Although the budget request focuses on safety, capacity work will continue. The FAA, however, is looking for some innovative and unique ideas to do more capacity work without affecting the safety R&D budget.

The REDAC asked Mr. Keegan what information they could provide him.

Mr. Keegan responded that he would like the REDAC to help prioritize research activities. He asked for suggestions on what elements might be missing from the current program. For example, what will it take to make the FAA's R&D program cutting edge? He also asked the REDAC for help in obtaining and sustaining a long-term research agenda

The REDAC asked Mr. Nick Sabatini, Associate Administrator for Regulation and Certification, the same questions. He responded that international R&D projects are very important. Such projects not only serve our national interests, but also raise the safety bar for all.

Paul Galis, Office of the Associate Administrator for Airports asked if the REDAC thought the FAA was concentrating too much on safety and not enough on capacity?

Dr. John Hansman responded, asking if there might be some inherent levels of risk between safety and capacity? He stated the question of how to strike the balance is something we should look at for 5-10 years. Safety is the right thing now, but maybe a little too narrow.

Paul Drouilhet stated the FAA is also very reactionary when it comes up with solutions, "the urgent overtakes the important."

Jim DeLong commented that the idea of putting safety above all else is not the answer either.

Paul Drouilhet stated that the REDAC needed the FAA's help in determining what the right balance is.

Nick Sabatini responded that we are on the threshold of doing safety things with airplanes (bringing them closer together). Do we need to know more about this area and to investigate further?

Carl McCullough stated there is a need for balance among the strategic goals, but we need to also address environmental issues as well. In the international arena we have taken a strong role at ICAO and unless we continue investing the environment, someone else will.

Patricia Grace-Smith stated that Mr. Keegan is correct on the safety front, but with the research being done today, we need to be aware of changes coming to the system. More global entities will be interested in our systems. We can help regulate and invent more and better ways to travel. There are policy and other considerations that would help to determine environment policy.

Dr. Hans Weber commented that 20 years down the road there will be a very different picture. There is a correlation between capacity and safety. How are we going to get to adequately define the 20-year system now? The Europeans are already ahead of us now.

Charlie Keegan responded that funding is the problem. There are times to lead and not times to lead. Unless we know what we are doing, we don't want to be in front. We don't know where we want to be. Technology-wise we are okay. Communications is where we are lacking research. We need more. The sharing with DoD would be a good thing. Charlie Keegan responded that there are tiered levels to accomplish our goals. We respond to urgency and only when we get in front of the "glass."

Steve Brown, FAA Associate Administrator for Air Traffic Services, recalled when he was a member of REDAC in the early 1990s, the REDAC concentrated a little more on specific things. It appears that the Committee does not have a clear strategic plan. We need to:

- 1) focus on major metro areas for improvement of capacity and proficiency.
- 2) ensure an en route system that has collaborative capabilities.

Steve Brown stated that the with current world environment, we must choose priorities carefully and determine a better strategy, perhaps compromising on issues more than we have had to in the past. The international arena is not a very pretty place for us right now.

Charlie Keegan stated we are doing things now that we know we need to do differently. One thing that we need to take from industry, we do need to learn to let someone else take the "lead."

Amr ElSawy (MITRE) commented that wake vortex is a very sensitive topic and is not looked on as important, and asked Steve Brown where he would like to see it positioned?

Steve Brown responded that he would like to see successes. He stated that the FAA cannot afford the journey step-by-step, but there are innovations that take time to mature in the industry.

Dr. John Hansman asked Steve Brown, to think about key leverage points and how the REDAC can better engage with FAA's strategic areas?

Dr. Hans Weber stated we need to establish the necessary infrastructure, and once we do that, we need to come up with ideas and thoughts and examine what has worked elsewhere in the world.

Charlie Keegan responded by saying that the FAA policy is not aligned with international standards. A good idea does not allow us to lead. We need to work within the greater community -- there are many other people who need to be engaged.

Dr. Rediess stated that the Europeans are developing an R&D strategy. The FAA just held a joint vision meeting with NASA and DoD and he was encouraged to have their support. He said that the FAA needs significant investment to undertake strategic planning for the future aerospace system.

Carl McCullough stated the FAA has options that are not available in Europe. He remarked that the FAA definitely wanted to take a U.S. approach. Our approach at this point should probably be, "What can we NOT fail at?"

Steve Brown said that the FAA is looking at capacity enhancing techniques, including doing work in the weather area.

John McCarthy commented that the jump seat rides really helped REDAC members understand how and why the cockpit operates the way it does. It was a great learning tool and one that would be helpful to reinstate.

Ron Swanda asked if the FAA is still getting the right caliber of people and how do we look on the future?

Steve Brown responded that in the 1990s it was difficult to attract people to the FAA.

Charlie Keegan said that during the dotcom rise it was difficult attracting new employees to the FAA. However, the FAA is doing well -- core competencies are there as needed.

Dr. Deborah Boehm-Davis asked about the goals in each of the line of business their portfolios?

Patricia Grace-Smith commented there is an internal council and there are priorities made and then reported back to industry.

Ms. Sharon Pinkerton stated research is absolutely essential. The tradeoffs are carefully looked at.

Steve Brown commended the committee members and how things matured over the years. He mentioned John McCarthy who did much research.

Paul Galis discussed the financial assistance program - airports will get \$9 billion in improvements. The advisory circulars will continue to be issued and updated.

Charlie Keegan said many times, we learn more by research failure. The successes are good, but the failures can be good as well. The current budget, however, does not allow for that failure. It is sort of counter-culture. We are going to have a hard time modernizing if we cannot explore.

Jerry Thompson commented it is the REDAC's view that the FAA FY 04 R&D budget needs more money.

Charlie Keegan responded that more money was not possible. The FAA is fully funded and well off in some places and is lacking in some areas. There is a shortage in the Operations account. If there are targeted programs that can catch the attention of the Congress, and that could be done and planned in five years, perhaps Congress can be shown that this money is needed.

Dr. Deborah Boehm-Davis stated the industry is not picking up the areas that we once thought. Therefore these programs will not be done and these will suffer impacts because the FAA is not doing them and neither is industry.

Charlie Keegan commented it would be useful to know what constitutes a reasonable R&D program. When do we know enough? Do we really want to spend more?

Committee Discussion on Recommendations and Future Activity

Dr. Deborah Boehm-Davis asked the members to review the discussion draft, a compilation of all the subcommittee reports. The members are to provide comments back to Deborah within a week. The Committee's final recommendations are provided in Attachment 4.

Dr. Deborah Boehm-Davis and Dr. Herm Rediess thanked the members for their work and the meeting was adjourned.

Attachment 1

**Research, Engineering & Development Advisory Committee (REDAC)
Federal Aviation Administration – Bessie Coleman Room
800 Independence Avenue, SW, Washington, DC 20591**

April 29-30, 2003

AGENDA

Day 1 – April 29

8:30 a.m. – 9:00 a.m.	Welcome and Introductory Remarks Welcome New Members <ul style="list-style-type: none">- Jerry Thompson- Ray LaFrey- Paul Polski- Dave Watrous Farewell to Retiring Members <ul style="list-style-type: none">- Mike Benzakein- Jim DeLong- John Hansman- Louis Mancini- John O'Brien- Deborah Boehm-Davis	Dr. Deborah Boehm-Davis, Chair Dr. Herman Rediess, FAA
9:00 a.m. – 9:30 a.m.	Remarks	Hon. Marion Blakey, FAA
9:30 a.m. – 9:45 a.m.	Remarks	Mr. Charles Keegan, FAA
9:45 a.m. – 10:00 a.m.	Meeting Process and Objectives	Dr. Herman Rediess, FAA
10:00 a.m. – 10:15 a.m.	BREAK	
10:15 a.m. – 10:45 a.m.	Flight Plan to 2020 and Beyond	Mr. John Kern, FAA
10:45 a.m. – 11:15 a.m.	Approval – Report on Aviation Communications Research Investments	Mr. Jerry Thompson Mr. Paul Drouilhet
	Subcommittee Recommendations	
11:15 a.m. – 12:00 p.m.	Subcommittee on Air Traffic Services	Mr. Jerry Thompson
12:00 p.m. – 1:00 p.m.	LUNCH	
1:00 p.m. – 1:45 a.m.	Subcommittee on Environment and Energy	Dr. John-Paul Clarke
1:45 p.m. – 2:30 p.m.	Subcommittee on Aircraft Safety	Capt. Chet Ekstrand
2:30 p.m. – 3:15 p.m.	Subcommittee on Airports	Mr. Richard Marchi
3:15 p.m. – 3:30 p.m.	BREAK	
3:30 p.m. – 4:15 p.m.	Subcommittee on Human Factors	Dr. John Hansman

4:30 p.m.	Adjourn	
Day 2 – April 30		
10:30 a.m.	Reconvene Meeting	Dr. Deborah Boehm-Davis, Chair Dr. Herman Rediess, FAA
10:30 a.m. – 10:45 a.m.	Subcommittee on Air Mobility for Small Communities (AMSC) – Terms of Reference Approval	Mr. Ron Swanda
10:45 a.m. – 11:15 a.m.	Goals-Based R&D Budget - FY 03, 04, & 05 Status - REDAC Advice Process	Dr. Herman Rediess, FAA
11:15 a.m. – 12:00 p.m.	Committee Discussion on Recommendations	Dr. Deborah Boehm-Davis, Chair
12:00 p.m. – 1:00 p.m.	LUNCH	
1:00 p.m. – 2:00 p.m.	REDAC Executive Recommendations to FAA Associate/Assistant Administrators	Dr. Deborah Boehm-Davis Mr. Jerry Thompson Dr. John-Paul Clarke Capt. Chet Ekstrand Mr. Richard Marchi Dr. John Hansman
2:00 p.m. – 3:00 p.m.	FAA Response to Committee Recommendations from FAA Associate/Assistant Administrators	Mr. Steve Brown, FAA Mr. Nicholas Sabatini, FAA Ms. Woodie Woodward, FAA Ms. Sharon Pinkerton, FAA
3:00 p.m. – 3:15 p.m.	BREAK	
3:15 p.m. – 4:00 p.m.	Committee Discussion on Recommendations and Future Activity	Dr. Deborah-Boehm-Davis
4:00 p.m.	Adjourn	

**Research, Engineering and Development Advisory Committee
April 29-30, 2003
Attendance**

REDAC Members

Dr. Deborah Boehm-Davis, Chair
Dr. Jeremiah Creedon
Mr. James DeLong
Dr. John Hansman
Dr. John McCarthy
Mr. Jerry Thompson
Dr. Dres Zellweger

Mr. David Ashley
Dr. Colin Drury
Capt. Chet Ekstrand
Mr. Ray LaFrey
Mr. Paul Polski
Mr. Dave Watrous
Dr. Herman Rediess, Executive
Director

Dr. John-Paul Clarke
Ms. Sarah Dalton
Mr. Amr ElSawy
Mr. Richard Marchi
Mr. Ron Swanda
Dr. Hans Weber

Other Attendees

Hon. Marion Blakey, FAA
Paul Galis, FAA
Patricia Grace-Smith
Mike Ball, Northrup Grumman
Jeff Breunig, FAA
Bruce Carmichael, NCAR
Bill Davenport, ACPA
Mary Beth Dormuth, FAA
Bill Edmunds, ALPA

Warren Fellner, Titan
Mike Gallivan, FAA
Lauren Grace, FAA
John Hancock, FAA
Stephanie Roth, CSSI, Inc.
Claude Jones, FAA
John Kern, FAA
Steve Lang, FAA
George Marania, FAA
Lourdes Maurice, FAA
Paul Murphy, SETA II
Mike Perie, ATCA
Roy Reichenbach, Rand Consultant

Chuck Ruehle, FAA
Sabrina Saunders-Hodge, FAA
David Smith, FAA
Wes Timmons, FAA
Alice Wong, FAA
Gloria Dunderman, FAA
Fran Chesley, CSSI, Inc.
Michelle Rodrigues, SRI

Charlie Keegan, FAA
Carl McCullough, FAA
Satish Agrawal, FAA
Joan Bauerlein, FAA
Carl Burleson, FAA
Guinn Clark, Pegasus
Cynthia Deyoe, FAA
Paul Drouilhet, MIT/Lincoln
Ed Feddeman, House Science
Committee
Dennis Filler, FAA
Aaron Gellman, NU
George Greene, FAA
Anne Harlan, FAA
Chuck Johnson, NASA
Paul Jones, FAA
Terry Kraus, FAA
Chuck Larsen, FAA
Rick Marinelli, FAA
Sharon Moreland, FAA
Dennis Nichols, FAA
Sieg Poritzky, Consultant
Mike Wambsganff, Metro
Aviation
Chris Seher, FAA
Katherine Shaffer, FAA
Ed Spitzer, DOT/VOLPE
Vanessa Waddy, FAA
Richard Young, AVMET
Denise Davis, FAA
Benjamin Neumann, NASA

Steve Brown, FAA
Nick Sabatini, FAA
Brian Bagstad, FAA
Gamblin Berz, Flight Explorer
Hank Cabler, FAA
Victoria Cox, OSD
Robert Doll, Self
Paul Dykeman, FAA
Wilson Felder, FAA

Frank Frisbie, NGIT
Philip Genua, FAA
Debra Griffith, FAA
Terry Hertz, NASA
Chuck Jones, NATCA
Aditya Kamal, ARCON
Gloria Kulesa, FAA
James Link, FAA
Rosanne Marion, FAA
Geoff Mumford, APA
Lee Olson, FAA
Tom Proeschel, FAA
Charles Huettnner, Charles
Huettnner Associates
Adrian Serafini, FAA
Scott Simcox, NEXTOR
Nick Stoer, NSA
Mark Rodgers, FAA
Rick Zelenka, Boeing
June Green, BAE
Cathy Bigelow, FAA

**Report from the Subcommittee on Air Traffic Services
Chairman: Mr. Jerry Thompson**

1. Current FAA Program Lacks Long Term R&D Component
 - Our review of the FAA FY05 RE&D and F&E Area 1 Budgets has shown that the planned research has been limited to activities necessary to meeting FAA's Operational Evolution Plan (OEP) milestones and is generally limited to safety items.
 - Operational costs of both users and the FAA are skyrocketing. Continuing the OEP efforts efforts is essential to the industry's near term health but mid and longer term research activities are needed develop approaches to fully bring these cost under control and to provide the capacity needed in the future.
 - A broad based R&D program that addresses the future needs of the nation and the FAA is needed. In addition to the items currently shown in the FY-05 RE&D budget the FAA should request sufficient funding to support its role in defining, planning, developing, and implementing the Next Generation Air Transportation System
2. Additional RE&D Funding Is Needed for Next Generation Air Transportation System
 - We need to begin now to design, develop, and implement the Next Generation Air Traffic Management System that will be needed to enable the U.S transportation system growth and to maintain the U.S. role as world aviation leader. Failure to make these investments in a timely way will surely cause the air transportation system to constrain future U.S. economic growth.
 - To complete the OEP work and begin design and development of the Air Traffic Management System for the next generation air transportation system, FAA will require more R&D funding than shown in the FAA FY05 plan.
 - We recommend that FAA request this additional funding.
3. Interagency Office is Needed to Implement Next Generation Air Transportation System
 - The Commission on the Future of the United States Aerospace Industry November 2002 report included recommendations to establish a "Next Generation Air Transportation System Joint Program Office" from the resources of FAA, NASA, DoD, DHS, NOAA, and other relevant government organizations.
 - This Subcommittee agrees with Commission's recommendation. An Interagency Office that completes the overall strategy and planning, coordinates research efforts between agencies; and evaluates individual agency programs is needed to provide the leadership necessary to effectively and efficiency implement the Next Generation Air Transportation System.
4. Funding Needed to Support FAA's Role of Transitioning Research to Implementation:
 - The FAA, to fulfill its role in an interagency program, needs the research and development budget required to study and plan the evolution of the NAS, evaluate the research products received from NASA, CAASD, et al either in actual or simulated field conditions, and modify these products for integration into the NAS. We believe FAA will be unable to accomplish this role with the funding requested in its FY05 budget planning.
 - Recommend the FAA increase its funding request in FY05 for this work.

Specific Comments/Recommendations on the President's FY04 Budget Request and the FAA's FY05 Budget Planning:

1. Aviation Weather Research

- FAA's FY04 Budget Request and current FY05 budget plan eliminated Aviation Weather Research in the Capacity/ Efficiency research areas and reduced requested funding in the remaining safety related parts of the program.
- The Aviation Weather Research program has produced effective, needed products and has more of them under development. Reductions in FY04/05 will impact work on Turbulence Forecasts for use by Oceanic flights, Ceiling and Visibility forecast products and others.
- Funding should be provided to the Aviation Weather Research Program to allow it to deliver all its planned OEP timeframe products.

2. Traffic Flow Management (TFM)

- We are pleased to see that work is being proposed to address how traffic flow management should deal with uncertainty of NAS daily operations (air carrier, special use airspace, weather impacts, etc.). This is a very important area, especially as weather forecasts have become more reliable.
- The Subcommittee also endorses the research proposal to study/model how TFM fits into the overall NAS command and control structure.
- Concern that these proposed research areas, which might have major payoffs possibly in the next five years, will not be funded due to more near term priorities.

3. Safe Flight 21

- The program appears to be going well and may well be a stepping stone to the next generation ATM system.
- We are concerned that Safe Flight 21 has not yet communicated the strong business (and/or safety) case that is necessary for further incorporating its developed technology and processes into the NAS
- We believe that the Safe Flight 21 Program must develop and communicate this strong business (and/or safety) case.

4. Runway Incursion Reduction Program

- The program briefing we received proposed an evaluation of Runway Status Lights utilizing AMASS/ASDE-3 as the data source. Our concern is that prior work by Lincoln and Volpe has shown that AMASS/ASDE-3 by itself is not an acceptable data source.
- Suggest that multi-lateration and possibly ASD-B data would be needed to adequately drive a runway status lights system.

5. Wake Vortex

- This activity holds significant promise for great payoff in safety and capacity benefits. A joint FAA/NASA program has been formulated and its content and strategy have been endorsed by LL/CAASD studies to provide near term benefits through procedural changes, mid-term benefits using weather dependent procedures, and long term benefits by incorporating automation enabled decision support tools.
- The Subcommittee is aware that FAA's FY04 Budget Request contained no contract funds for Wake Turbulence due to higher budget priorities. If no contract funds are appropriated in FY04, it is recommended that FAA insure that the personnel working on the wake turbulence program continue the work even in the absence of contract funds. It is also recommended

that the FAA request steady funding for this program (in FY05 and beyond as identified in the Wake Turbulence Program Plan) to allow it to deliver its planned products.

6. Research Associated with Free Flight Phase 2

- We are concerned with the FAA decision to curtail funding the research aspects of the Free Flight Phase 2 Program. This will dramatically slow the pace at which needed new capabilities can be introduced into the NAS.

7. Phased Array Radar (PAR):

- This is currently a Congressionally directed program being carried out at the WJHTC. Work is being done in close collaboration with the Office of Naval Research and NOAA's National Severe Storms Laboratory.
- FAA should include in its FY05 budget request funding to support its share of this effort

Report of the Subcommittee on Environment and Energy

Chairman: Dr. John-Paul Clarke

Questions

- **In what areas should we be investing RE&D funds?**
- **In what area(s) are we investing that we should not be?**
- **Are the program priorities correct?**
- **If not, then what should the priorities be?**

Context

- **Noise and emissions are major obstacles to the growth of aviation**
- **September 11, 2001 has afforded us an opportunity to deal with tough issues**
- **EU has aggressive noise and emissions research program**
- **If we want to enable growth, we need to fund noise and emissions research!**

Committee activities

- **March 19 meeting at FAA HQ**
NASA QAT program update
FY-04 appropriations
Vision for AEE
FY-05 programs & budget
- **E-mail discussions**

NASA QAT update

- **Good example of partnership between the FAA and NASA**
- **FAA funds used to push promising research to higher technology readiness levels**
Sub-committee very pleased with past results and would like this to continue if congress augments funding for this activity in the FY05 appropriation

FY-04 appropriations

- **FAA budget for AEE was \$7.698M**
- **Congressional appropriation was \$22.1M**
\$15M earmark for NASA QAT program
»Includes \$850K for Louisville low noise procedures
\$600K earmark for MSP low frequency noise study

\$6.5M for other AEE programs

»Includes \$300K for Noise Center of Excellence

Vision for AEE

- **Response to challenge by sub-committee to develop RE&D program from “clean sheet” of paper**
- **AEE met and exceeded the challenge!**
- **Committee endorses the vision of a holistic approach to environmental regulations and addressing noise and emissions issues**

• FY-05 programs

- **Aviation Environmental Design Tool (AEDT) is top priority**
- **Center of Excellence (CoE) is a close second**
- **Aviation Environmental Portfolio Management Tool (AEPMT) is third**

FY-05 programs

- **Great research portfolio**
- **Programs are appropriate, but a comprehensive look at environmental issues should include:**

Water quality (requires appropriate partnerships as water quality outside mandate of AEE)
Additional emphasis on climate change issues (requires appropriate partnerships)

FY-05 budget

- **FAA budget for AEE is \$7.7M**
- **Flight 100 reauthorization includes up to \$20M from AIP fund to advance noise and emissions fundamental knowledge and abatement practices**
Dedicates a small portion of the noise set aside of the AIP fund to noise and emissions research

Recommendations

- **Support FAA budget for AEE**
- **This should be the minimum funding level!**
- **Enthusiastically support use of \$20M from AIP fund to advance noise and emissions fundamental knowledge and abatement practices**
- **These funds must be used exclusively for noise and emissions research i.e. funds should not be diverted to other activities!**

Recommendations

- **Maintain core RE&D funding for continuing research to develop and enhance regulatory tools**
- **Seek to increase RE&D investment on environmental issues to \$22M per year within the next 5 years**

Recommendations

- **Establish a more rigorous review process for its R&D program – expand REDAC subcommittee meetings to two days**
- **Establish a more rigorous process for publishing and disseminating research results**
- **Allocate resources for staff to build skills and tools necessary to manage the expanded program**

Recommendations

- **Spend some effort engaging the stakeholder community, quantifying the goals and payoffs of R&D efforts**
- **Enhance and expand partnerships with other agencies, industry, academia, internationally, and with states**

Answers

- **What areas should FAA invest its RE&D funds?**
The current areas are appropriate
- **In what area(s) are we investing that we should not be?**
N/A
- **Are the program priorities correct?**
Yes
- **If not, then what should the priorities be?**
N/A

-program through research areas (e.g., Maintenance HF) to specific projects (e.g., Broadband Technologies in Maintenance), to include F&E, and all other contributing funding sources.
-Decisions about ending specific projects could then better be discussed and recommended.

Report of the Aircraft Safety Subcommittee Chairman: Capt. Chet Ekstrand

REDAC SAS Committee Changes

Due to business pressures, our esteemed chairperson, Dr. Lou Mancini, is unable to continue as SAS chairperson.

Lou sends his regrets and appreciation for the outstanding support FAA researchers and leaders have provided during his tenure as chairperson.

Captain Chet Ekstrand of Boeing will succeed Lou as SAS chairperson.

General

The Subcommittee on Aircraft Safety of REDAC believes in:

The importance of the safety-related research that is being done by the FAA.

The abilities of the FAA staff and their contractors to carry out this important work.

Presentation Structure & Process

Observation—The committee fully endorses our current practice for annual reviews:

One with high level briefings from sponsoring organizations detailing current and future R&D requirements

One with more detailed project level presentations made by the research performing organizations.

However, the committee does not feel that enough is currently included regarding requirements driving the research.

Presentation Structure & Process

Recommendations:

Provide more requirements information as an important part of future sponsor presentations

Provide detailed task performance information during the summer sessions with providers.

Provide R&D funding information summarized in an easily understood format for the overall

Presentation Structure & Process

Observation—The committee continues to believe that some projects have out-lived their usefulness:

FAA resources have become more limited, making need to continually examine relevance even more important.

Not enough information is presented that would facilitate project termination recommendations. Additionally, it was hard to tell when many of the projects would end, making judgments about research timeliness speculative.

Recommendation—The committee would like:

Information that would facilitate project termination decisions.

More emphasis on project end dates.

SASO

Observation—The SASO end goal of PMI standardization is good. Concerns do, however, exist: There was no industry involvement and

Some of the guidelines are not relevant to safety.

While the project is moving in the right direction, the committee was disappointed that its recommendations from the last meeting had not yet been carried out.

Recommendation—The FAA should continue to obtain more industry involvement, especially with airline Directors of Safety.

FAA/NASA/Industry Communications

Observation—It is not clear that progress is being made to dovetail NASA applied research results to FAA development needs. One outcome is that the FAA has trouble keeping up with the industry in new development areas.

Recommendation—The committee would like practices put in place that would:

Assure results from applied NASA research, relevant to the FAA mission, are exploited in a timely, efficient and consistent manner.

Include industry, in discussions with NASA to provide views on their R&D needs with regard to new technologies.

Research vs. Development

Observation—Several issues arose over the

% of Research vs. the % of Development being done by the FAA:

Whether the FAA needs to be more proactive in R&D

Whether the FAA should allow researchers to control some funds independently of the TCRG process.

Recommendation—The FAA should receive responsibility, authority, and accountability guidance regarding overall R&D issues by the full REDAC, which will allow the subcommittees to provide guidance in a more consistent fashion.

FAA Career Development

Observation and Recommendation:

The committee suggests that the FAA establish career development goals that foster improved researcher/sponsor relationships.

The committee encourages the FAA to move high-performing personnel in and out of research, for career development purposes and to foster researcher/sponsor working together relationships.

Internships

Cross-functional assignments

**Report of the Subcommittee on Airports
Chairman: Mr. Richard Marchi**

Potential Conflict of Priorities

- **Pavement R&D is large share of total (55%)**
- **Safety R&D needs more funding.**
- **F/Y '04 budget request and '05 planning provide increase for safety research.**
however, Priorities May Need to be Reordered
- **If increased funding for safety is not forthcoming in F/Y '04/'05**
- **Non-core pavement research funds may need to be redirected to safety projects.**
with that caveat, Support FAA proposed funding plan

High Priority Projects

- **New Large Aircraft**
 - Quickly complete T/W deviation studies
 - Assess ARFF requirements
- **Wildlife hazard abatement**
 - Coordinate radar development with others
- **Runway safety initiatives**
 - Visual aids
 - Incursion prevention

High Priority Projects

- **Runway safety initiatives (cont'd.)**
 - Friction measurement
 - New arrestor materials
 - Pavement roughness measurement
- **De-Icing fluid specifications**
 - Improve environmental compatibility
 - Reduce risk of aircraft corrosion
- **Wake vortex research**

Report of the Subcommittee on Human Factors
Chairman: Dr. John Hansman

Committee Activities

•February Meeting (Washington)

- Focused Review of Aviation Maintenance Program
- Review of Planning White Sheets
- Discussion of issues for April REDAC meeting
- Presentation of Potential Interagency ATC Approach
- Committee Discussion with Associate Administrator for R&A

Questions for April Meeting

•Portfolio Content (Planning White Sheets FY05)

- What is missing
- What is not needed

•Partnerships

•Process

•Additional Guidance and Recommendations

Maintenance Program Review

- Program Management and Communication excellent**
- Program moving in the right direction**
- Elements reviewed generally of high quality**

Portfolio Content

•Proposed “05” Program Elements Generally Appropriate

•Missing Elements

- Cultural Issues
- Cultural transition issues
- Organizational safety
- Fundamental Work on Human Role
- How productive and effective are humans in the loop
- Capturing “Lessons Learned” from Introducing New Technologies
- Linkage to ASRS?

•Not Needed

- Sport Pilot Element

Partnerships

•CAST should be used as a mechanism to link the research with industry needs

- Mechanism to communicate good work being done

•International Partnerships

- Good in Air Traffic (Eurocontrol, Iceland)
- Flight Deck research findings limited by international competitiveness concerns

•Participation by airlines difficult due to current economic issues

•NASA

- Partnership good but needs to survive lack of funding
- NASA has critical capabilities.

•TSA

- ?

Process

- Issue of how the Committee can help define upstream research requirements**
 - Review TCRG Process
- Difficult to engage effectively in limited time**
 - Relevance of subcommittee input. Can we provide credible advice given the depth of presentation we can afford time
 - Need materials in advance
- Consider focused study panels**
 - Safety Culture
 - Cultural-Technical Change
- Interaction with other Subcommittees**
 - Safety, ATS cross participation

Other

- Human factors newsletter effective**
- Concern regarding congressional set asides**
 - May degrade the integrity of the research plan and program
 - Proportion growing
 - Overall R&D Level going down
- Use of R&D money to fund HF positions in line organizations?**
- Access to Facilities Critical for HF Work**
 - Air Traffic Control
 - Maintenance
 - Cockpit



Dr. Deborah A. Boehm-Davis
Chair, Research, Engineering and Development Advisory Committee
Professor of Psychology, George Mason University, 4400 University Drive,
ARCH Lab MSN 3F5, Fairfax, Virginia 22030-4444

June 3, 2003

The Honorable Marion C. Blakey
Administrator
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Dear Ms. Blakey:

I am delighted that you were able to join us at our Federal Aviation Administration (FAA) Research, Engineering and Development (REDAC) Advisory Committee meeting this April. The Committee members enjoyed your remarks and the opportunity to engage in a discussion with you. The Committee members also valued the participation of several associate administrators in the most recent meeting. We look forward to a continued and fruitful dialogue with these members of your senior management team in future meetings.

On the basis of our meeting, we have developed several recommendations.

- We recommend that FAA develop a mechanism for supporting deployed technology, especially that technology designed or developed by FAA. FAA needs to maintain the expertise needed to keep systems (such as TCAS) functional.
- We continue to believe that funding R&D out of F&E accounts creates several impediments to the conduct of research. Placement of money in this category of funding makes it difficult to identify what is being spent on research; it makes it easy to divert funds intended for research to other activities; and it does not allow funding to go to universities, where much research is conducted. The committee would like the opportunity to work with you to inform Congress of the difficulties created by funding R&D out of F&E funds.
- Lack of access by researchers to aviation-related facilities continues to be an impediment to research. Access to airports, air traffic control and maintenance facilities, and to the cockpit is needed to ensure that research focuses on actual practice rather than a researcher's interpretation of what practice might be based on available documentation. Although the committee recognizes the paramount importance of safety and security precautions, we recommend that mechanisms be developed to allow legitimate researchers to gain access to relevant facilities for the conduct of their research.
- We support the formation of a Joint Program Office on the Next Generation Air Transportation System to increase interagency coordination, focus on moving R&D products into operations, and develop a strong systems engineering basis for decision-making.

- We ask that you continue to encourage senior associate administrators to meet with the REDAC to help identify emerging needs. We feel that continued dialogue such as that begun at our last meeting can help move the agency's research program beyond work focused solely on today's operations and help prepare the country for the NAS of the future.

In addition, individual subcommittees developed recommendations for your office. Those recommendations are presented in the attachment.

I am interested in discussing these recommendations with you at your earliest convenience. The Committee continues to be dedicated to providing you with advice and recommendations on any R&D issue that you may need us to review. I look forward to the selection of a new Advisory Committee chair and I stand ready to work with you and the new chair on a smooth transition.

Sincerely,

Deborah A. Boehm-Davis, Ph.D.

Chair

FAA Research, Engineering and Development Advisory Committee

ATTACHMENT

Subcommittee Recommendations

Air Traffic Services

General Recommendations concerning the President's FY04 Budget and FAA's planning for FY05:

1. **Current FAA Program Lacks Long Term Research & Development Component:**

Our review of the FAA R,E&D and the F&E Activity One research and development budget plans reveals that the planned research and research support is limited to activities necessary to meet FAA's Operational Evolution Plan (OEP) milestones and is narrow in scope with only safety-related R&D.

Operational costs of both users and the FAA are skyrocketing. Continuing the OEP work is essential to the aviation industry's near term health but mid and longer term research activities are needed to develop approaches to bringing operational costs under control and providing the capacity needed in the future when the public resumes its full utilization of the air transportation system.

The Commission on the Future of the United States Aerospace Industry in its November 2002 report, recommended "Rapid deployment of a new, highly automated Air Traffic Management System, beyond the FAA's Operational Evolution Plan, so robust that it will efficiently, safely and securely accommodate an evolving variety and growing number of aerospace vehicles and civil and military operations; accelerated introduction of new aerospace systems, by shifting from product to process certification and providing implementation support; and streamlined new airport and runway development." This Subcommittee agrees with these Commission recommendations.

We need to begin now to design, develop, and plan the implementation of the "next generation" air transportation system that will enable the U.S. to achieve a higher standard of living and quality of life while maintaining/enhancing the US share of the world's aviation market. The time to improve capacity is before it is needed and not after it is required. It is very difficult and doubly expensive to implement improvements in a system under stress. Failure to make these R&D investments in a timely way will surely cause the nation's air transportation system to constrain future U.S. economic growth.

Recommendation: A broad based R&D program that addresses the future needs of the nation and the FAA is needed. In addition to the items currently shown in the FY-05 R,E&D budget planning, the FAA should request sufficient funding to support its role in defining, developing, and implementing the "next generation" air transportation system.

2. **Joint Program to Establish Next Generation Air Transportation System:** As part of the Commission on the Future of the United States Aerospace Industry November 2002 report's recommendation for the deployment of a new, highly automated Air Traffic Management System, the Commission also recommended that a Next Generation Air Transportation System Joint Program Office be formed from the resources of FAA, NASA, DoD, DHS, NOAA, and other government organizations. This Subcommittee agrees with the Commission's recommendation. A interagency office that is responsible

for the overall strategies, transformational planning, and agencies' performance of assigned tasks is the only way that government can provide the leadership necessary to move to the "next generation" air transportation system. **Recommendation:** The Federal Government should form an interagency office to guide the creation and implementation of the "next generation" air transportation system.

3. Funding to Accomplish FAA's R&D Role of Transitioning Research to

Implementation: FAA's role is to be a catalyst for NASA, CAASD, and other research to assure that advances toward transformation of the National Airspace System (NAS) are developed in an orderly, effective manner; then, gather the resulting research products and integrate them into the NAS. FAA must have a research and development budget to study and plan the evolution of the NAS, evaluate research products, and adapt them for integration into the NAS. Included in this requirement, is the need to sponsor parallel research with NASA and other agencies on promising technologies that the FAA has identified as the likely path of evolution. This budget requirement is different from NASA's, which is aimed at supporting the FAA and other users of the NAS in addressing fundamental issues and in providing high risk, but high pay-off alternatives. FAA requested funding to accomplish its roll role has been reduced so much that we believe FAA will be unable to accomplish this role to such an extent that we believe that much of the research to improve the air transportation system, on-going within NASA and else where will be lost. **Recommendation:** The FAA should either increase its funding request in FY05 for this work (as part of a "next generation air transportation system" funding request) or look to research organizations, needing this role to be accomplished by the FAA, to fund the FAA for this transitioning work.

Specific Comments/Recommendations on the President's FY04 Budget Request and the FAA's FY05 Budget Planning:

1. **Aviation Weather Research:** FAA's FY04 Budget Request and current FY05 budget plan eliminated the Aviation Weather Research Program's funding for capacity/efficiency related weather research and reduced the Program's funding for the remaining safety related research parts of the program. The Aviation Weather Research Program has produced effective, needed products and has more of them under development. Reductions in FY04/05 will either halt or slow work in many productive research areas including ceiling and visibility forecast products for Alaskan users, 2 – 4 hour frozen precipitation forecasts for users flying hazardous mountain terrain, and in-flight icing and convective weather induced turbulence forecasts for oceanic flight planners. **Recommendation:** We recommend that the Aviation Weather Research Program be funded in FY05 at least at its appropriated FY03 level.
2. **Traffic Flow Management (TFM):** We are pleased to see that research is being proposed to address how FAA copes with uncertainty in TFM. This is a very important area to improve the NAS's efficiency. As weather forecasts become more capable, the effectiveness of TFM will increase, provided that TFM can effectively utilize the forecast improvements.

FAA has also proposed research to better integrate TFM into the overall NAS command and control structure. The current TFM system grew in place to solve discrete problems, with possibly shortsighted objectives. It is important to fund this proposed research that

potentially can integrate the distinct TFM tools into a system for achieving the nation's broader traffic flow management objectives.

We are concerned that these proposed TFM research programs will not survive in the smaller Free Flight Phase 2 requested budget in FY04 and planned budget for FY05.

3. **Safe Flight 21:** The program appears to be going well, and may well be a stepping-stone to the next generation air traffic control/management system. We believe that Safe Flight 21 must develop, as part of its program, a strong business case so promising results of this program will be incorporated into the NAS.
4. **Runway Incursion Reduction Program:** The program briefing we received proposed an evaluation of Runway Status Lights utilizing AMASS as the data source. Our concern is that prior work by Lincoln Laboratory and Volpe National Transportation Systems Center has shown that AMASS by itself is not an acceptable data source. The Committee suggests that Multilateration and possibly ADS-B data would also be needed to adequately drive a runway status lights system.
5. **Wake Turbulence Research:** This activity holds significant promise for great payoff in safety and capacity benefits. A joint FAA/NASA program has been formulated whose content and research strategy agree with the recommendations of an independent joint study by Lincoln Laboratory and MITRE/Center for Advanced Aviation System Development. The research, if successful, will provide near term increases in runway throughput through procedural changes, mid term benefits using weather dependent procedures, and long term benefits by incorporating automation enabled decision support tools. Potentially this research will yield a low-cost, high payoff method for increasing airport capacity.

The Subcommittee is aware that FAA's FY04 Budget Request contained no contract funding for Wake Turbulence research due to higher budget priorities. If no contract funds are appropriated for this work in FY04, it is recommended that FAA insure that government personnel working on the wake turbulence program continue the research even in the absence of contract funds. It is also recommended that the FAA request steady funding for this Program in FY05 and beyond (as identified in the Wake Turbulence Research Management Plan) to allow the Program to deliver its planned products.

6. **Research Associated with Free Flight Phase 2:** We are concerned with the FAA decision to curtail funding the research support activities of the Free Flight Phase 2 Program. This will dramatically slow the pace at which needed new capabilities can be introduced into the National Airspace System. (This is a specific example of the problem discussed under our General Recommendation 3 – "Funding to Accomplish FAA's R&D Role of Transitioning Research to Implementation.")
7. **Aeronautical Data Link Applications: CPDLC Build 1, Build IA, Flight Information Services:** This is an essential enabler of NAS modernization and global standardization, and an area where air carrier investment in equipment has not received FAA support for real benefit. Specifically, use of FANS has been extremely limited in US airspace. Efforts in this FAA data link applications area should include convergence between oceanic and domestic environment.

8. **Phased Array Radar (PAR):** This is currently a congressionally directed technology application research program being managed by the staff at the FAA WJH Technical Center. Work is being done in close collaboration with the Office of Naval Research and NOAA's National Severe Storms Laboratory. FAA should include in its FY05 budget request continued funding of its share of this collaborative research effort because a high-resolution, solid state phased array radar, similar to systems used by the Navy on Aegis Cruisers and by the USAF Dew Line, has the potential of satisfying all FAA surveillance needs (weather, aircraft) with a single system.

The National Research Council has recommended that serious consideration be given to making the next generation NEXRAD a phased array radar. The next generation NEXRAD is now beginning its development and FAA participation in this research and development – through the PAR research program - is vital to insuring FAA's future needs are incorporated into the next generation NEXRAD development. FAA, NOAA and the USAF jointly funded the development of the current NEXRAD radar.

9. **Software-Intensive System Methodology.** It is imperative that the FAA procure ATC systems efficiently and preclude the loss of potential RE&D funds to pay for delays and overruns. Given the relative maturity and availability of CNS equipments and systems and the inherent difficulty of developing and upgrading software-intensive systems in the FAA's challenging environment of users, it is recommended that the FAA convene an independent panel to review the FAA's procurement methodology for complex software-intensive systems. The panel should also address if there are additional mechanisms for FAA to augment RE&D funds through greater exploitation of commercial RE&D programs.

Aircraft Safety

Observations: The System Approach for Safety Oversight (SASO) end goal of PMI standardization is good. The industry has objected because there was no industry involvement and some of the guidelines are not relevant to safety. Recently, the SASO Program Manager in the Flight Standards Service, under the Associate Administrator for Regulation and Certification, has prepared a tentative composition for the SASO group to include representation from the top 10, national, regional, and cargo airlines. The SAS also recommended an OEM (manufacturer). The Program Manager has further considered industry labor organizations (e.g. ALPA) but plans to concentrate on the DOS/Safety department community first. Although the project is moving in the right direction, the committee was disappointed that its recommendations from the last meeting had not been carried out yet.

Recommendation. The FAA should continue to get more industry involvement, especially with Directors of Safety at airlines. (This recommendation focuses on issues of implementation and not on the research.)

Airports

The Airport Technology Research Program has struggled for several years to balance the need to operate the expensive pavement test facility and maintain the scheduled airport pavement testing needed to support the development of new pavement design methodology with increasingly

pressing needs to address airport safety issues. FAA has attempted to gain increased funding above the F/Y '02 level of approximately \$7.5 Million so that these additional needs can be met without reducing the funding available for the paving research. In the F/Y '04 administration request, currently before the Congress, the funding would be increased to approximately \$16 Million; a level that the subcommittee feels will allow that balance to be achieved, should it be enacted. The F/Y '05 budget being developed will, for the first time, propose funding the Airport Technology Research Program under F&E. This is recognition of the Congressional action that has for several years moved the FAA's Airport Technology Research program from its AIP request to F&E.

The internal process for developing the F&E budget level for funding the program is currently underway and it is not clear what the ultimate funding level will be for this program. The subcommittee is increasingly concerned that, if substantial new funding does not become available for expansion of research in the safety area, we may not be able to continue to support the full range of pavement research contained in the base budget. Should additional funding not become available in either the F/Y '04 appropriation or the F/Y'05 budget request, we recommend that FAA work with the subcommittee to examine ways to re-allocate a portion of the pavement research to provide additional funding for safety issues in a way that continues to support the core needs of developing new pavement design tools.

With that caveat, the subcommittee supports the FAA F/Y '05 proposed funding program. Among the non-paving projects in the program the subcommittee feels should have high priority are:

Research regarding New Large Aircraft, with particular emphasis on quickly completing the taxiway deviation studies and assessing the need for new ARFF requirements.

Wildlife hazard abatement. However, there is some concern that FAA efforts to develop a low cost radar capable providing real time warnings of bird hazards would benefit by better coordination with research underway by Transport Canada and MITRE.

Runway safety initiatives, including runway incursion prevention, runway friction measurement, development of new arrestor materials and pavement roughness measurement.

Deicing fluid studies to develop standards that foster improved environmental compatibility and reduced risk of aircraft corrosion.

In addition, the subcommittee wishes to express support for the various capacity enhancing research efforts being undertaken in other parts of the FAA that are crucial to meeting the long term needs of airports, particularly the ongoing wake vortex research.

Environment and Energy

Observation: AEE has developed a holistic vision for noise and emissions research in support of their mission.

Recommendation: **Move forward aggressively with the holistic approach.**

Observation: AEE has developed a needs-based budget for their holistic vision that is comprehensive and well balanced.

Recommendation: **Increase the RE&D funding for AEE to \$22M to support the vision starting in FY05.**

Observation: AEE has proposed a center of excellence in aircraft noise mitigation. This is a significant step in the right direction but only addresses part of the holistic vision.

Recommendation: **Expand the scope of the center to include both noise and emissions.**

Observation: In addition, the re-authorization for the FAA includes allocation of up to \$20M from the AIP noise set-aside for noise and emissions research. The idea of setting aside additional funding for research is a good idea.

Recommendation: **Set aside a fixed fraction of the AIP to support noise and emission research.**

Observation: AEE program changes will require an expanded staff skill set and better external communication of research and ideas.

Recommendation: **Build skills and tools necessary to support programs, and be more rigorous about publishing and disseminating research results.**

Human Factors

The Human Factors Subcommittee reviews a portion of the research portfolio at each of their meetings. At its most recent meeting, the committee reviewed the maintenance research program. In evaluating that part of the R&D portfolio, the committee felt that some elements were missing. These included work on:

1. **Cultural Issues.** Specifically, the subcommittee felt that the role of cultural diversity in the maintenance workforce and the impact of cultural differences across countries on transition issues and organizational safety was not being adequately addressed.
2. **Fundamental Work on Human Role in Automated Systems.** Specifically, the subcommittee felt that more basic research was needed to understand how productive and effective are humans in the automated systems loop.
3. **Capturing “Lessons Learned” from introducing New Technologies.** The subcommittee felt it is important to capture reports of difficulties arising from the introduction of new technologies so that these data can be collated and systematically analyzed.

The subcommittee felt that one element of the proposed research program, the Sport Pilot Element, should have a lower priority for funding than it currently has.

The subcommittee felt strongly that neither industry nor the REDAC and its subcommittees have been as effective as they might be in helping the FAA prioritize research and in suggesting new avenues for research that might be appropriate. Specifically, the HF Subcommittee felt that it is important for REDAC subcommittee guidance to find its way into the Technical Community Representative Groups (TCRG) deliberations. Further, they feel that the Commercial Aviation Safety Team (CAST) should be used as a mechanism to link the research with industry needs.

In discussing this issue, the subcommittee suggested that it may be worthwhile to consider the implementation of focused study panels (e.g., in the area of safety culture and cultural-technical

change) to develop proposals about research that the FAA might consider funding. The output from the study panels could be integrated into the priorities arising in the TCRGs.

Finally, the subcommittee noted that access to facilities is critical for human factors work. This includes access to Air Traffic Control, Maintenance and Cockpit facilities. Although recognizing the need for safety and security precautions, lack of access to facilities will return research to the status of “ivory tower” work, disconnected from actual practice.